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## Ethical issues of engineering activity

Tomsk Polytechnic University

Vera Novikova <sup>a</sup>, Ivan Kolentsionok <sup>b</sup><sup>a</sup> Institute of Humanities, Social Sciences and Technologies, Tomsk Polytechnic University<sup>b</sup> Institute of Power Engineering, Tomsk Polytechnic University

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### Abstract

This paper discusses peculiarities of modern engineering ethical duties. The practical part of the paper gives full description of related lexical items: responsibility, obligation and duty and shows differences between them in relation to engineering sphere. The research is based on two respected dictionaries: Cambridge Advanced Learner's Dictionary and Thesaurus and English Oxford Dictionary. In this paper authors prove that professional engineers should always take seriously their responsibility. For the highest standards - honesty and integrity, safety and ethical behaviour, engineers should perform all the rules and obligations. It is necessary to mention that fundamental ethical standards for engineers are key elements of engineering field to clients, co-workers, employers and profession.

*Keywords:* modern engineer, responsibility, obligation, professional ethics;

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### 1. Introduction

The development of professional consciousness of engineers involves understanding the possibilities, boundaries and importance of the specialty. The meaning of understanding engineering activity is the realization of its goals and tasks.

Authors of this paper inquire features of modern responsible engineer.

Engineering activity implies constant use of scientific knowledge obtained as a result of scientific activity and which will be used to create such technical systems as structures, devices, mechanisms, machines, etc. This is the difference between the scientific and technical activities, based primarily on experience, practical skills, hypotheses.

It is known that the appearance of engineering activity as one of the most important types of labor activity is associated with the appearance of manufactory and machine production. In the Middle Ages, there was, more technical, and not engineering activity, related to the craft.

The history of the twentieth century remembers some significant structural failures, for instance, bridge failures, the Quebec Bridge collapse (1907) or the Boston molasses disaster (1919). Particularly, such disasters influenced engineers mind and forced them to form new technical requirements and practice of ethical standards. The twentieth century establishes the first model of engineering code of ethics, code of professional ethics, general principals and fundamental canons.

Nowadays many societies and institutes are appeared, National Society of Professional Engineers, American Society of Mechanical Engineers, Institute of Electrical and Electronics Engineers etc.

Modern engineering inventions create and support a new way of a person's quality of life. The product of engineering activity leads to the responsibility of the engineer and his ability to influence society. Thus, the development of technologies and social projects present the highest requirements especially to professional designers and constructors [4].

Paper outlines dictionary analysis of lexical items: responsibility, obligation and duty.

## 2. Practical part

Engineers now have lots of risks, shown by modern technologies. All obligations are given with the respect for the environment, with the care to cultural and historical heritage. Engineers face all ethical issues every day.

The example described by Dr. Martin Haigh, owner of training and development company, shows gradual involvement in his professional duties. Starting work as a project engineer he had lots of technical things and later he got many administrative duties as a principal engineer. Under his leadership there were several people, he worked with clients, he was engaged in management work. Having received a job promotion (Engineering director), he had all responsibilities for managing and supporting his employees. People management was priority. Technical and ethical factors were less high on the discussion. In conclusion, ethics and integrity became basic elements as he became Group Coach. Dr. Martin Haigh was responsible and centered on “confidentiality, identifying the most appropriate roles and ensuring that engineers were provided with the best possible training and development opportunities” [3].

So, we suppose it important to analyze three synonymic words and identify its lexical characteristics. Let's have a look at words *responsibility*, *obligation* and *duty* in “Cambridge Advanced Learner’s Dictionary and Thesaurus”. This explanatory dictionary gives the next definition: “*responsibility* – something that it is your job or duty to deal with”. The word *obligation* has two definitions: “the fact that you are obliged to do something” and “something you must do”. The word *duty* is described as “something that you have to do because it is part of your job, or something that you feel is the right thing to do” [1]. It follows that the word *responsibility* is characterized as a direct and non-judgmental activity, something that is a matter of course, something that you must perform a priori. The word *obligation* in its meanings shows the obligation to perform actions, to do what is prescribed in the code of rules or laws, for example. So in our case we are talking about the code of professional ethics and engineering obligations. The terms responsibility and obligation are found more often in the literature on engineering. The word *duty* is described as the necessity to do something either as a moral stance to do everything right.

Definition of the word *responsibility* in English Oxford Dictionary is following:

1. The state or fact of having a duty to deal with something or of having control over someone.
2. The state or fact of being accountable or to blame for something.
  - 2.1 A moral obligation to behave correctly towards or in respect of.
3. The opportunity or ability to act independently and take decisions without authorization.
  - 3.1 A thing which one is required to do as a part of job, role or legal obligation.

The word *obligation* is presented as

1. An act or course of action to which a person is morally or legally bound; a duty or commitment.
  - 1.1 [mass noun] The condition of being morally or legally bound to do something.
  - 1.2 A debt of gratitude for a service or favour.

1.3 [law] A binding agreement committing a person to a payment or other action.

The word *duty* has the following interpretation:

1. A moral or legal obligation; a responsibility.

1.1 [as modifier] (of a visit or other undertaking) done from a sense of moral obligation rather than for pleasure.

2. A task or action that one is required to perform as part of one's job.

2.1 [mass noun] Military service.

2.2 [as modifier] (of a person) engaged in their regular work.

2.3 [mass noun] Performance of prescribed church services by a priest or minister.

3. A payment levied on the import, export, manufacture, or sale of goods.

3.1 A payment levied on the transfer of property, for license, and for the legal recognition of documents. 4. [Technical] The measure of an engine's effectiveness in units of work done per unit of fuel [2].

The first definition of the word *responsibility* shows additional meaning 'control over someone'. The second definition exposes more moral obligation in comparison to "Cambridge Advanced Learner's Dictionary and Thesaurus". The third definition proves direct and non-judgmental activity of an engineer to act independently. The definition of the word *obligation* reveals new meanings related to law ('legally bound'), but as a whole it presents professional obligation as the highest moral principal of behavior. The given word *duty* has four definitions. All of them describe the word as a moral obligation, a responsibility, as a part of obligatory regular work.

### 3. Conclusion

In this way we conclude that English Oxford Dictionary gives extended definitions and fully describes and identifies all three words. It shows that obligations, responsibilities and duties are sets of engineering ethics.

Current situation on the problem of professional engineering ethics is being discussed. Engineers play a crucial role in protection and support of our quality of life. They contribute in developing and providing modern technologies to people lives. They all have responsibilities and we should promote ethical issues as well. Finally, professional societies and organizations should consider new ethical practice and direct engineers in fulfillment of their duties.

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